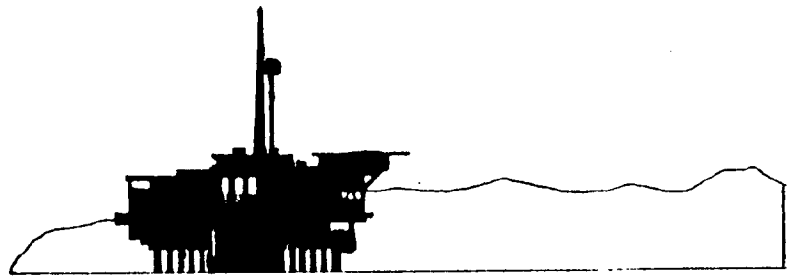


Huntington Beach Energy Series

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Report #3

Oil Spill Contingency Planning in Huntington Beach



City of Huntington Beach

Department of Development Services

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1981
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Planning Division

August, 1981

CITY OF HUNTINGTON BEACH

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HUNTINGTON BEACH ENERGY SERIES

REPORT #3

OIL SPILL CONTINGENCY PLANNING
IN
HUNTINGTON BEACH

CITY OF HUNTINGTON BEACH
DEPARTMENT OF DEVELOPMENT SERVICES
JAMES W. PALIN, DIRECTOR

AUGUST, 1981

TD427.P4 O45 1981 no. 3

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Foreword

This is another in a series of discussion papers on energy-related issues prepared by the Planning Division of the City of Huntington Beach. Huntington Beach is a center for many energy-related activities including onshore and offshore oil production, an electricity-generating power plant, and increasingly, solar and conservation technologies. The purpose of these reports is to help the City to accommodate the continued production of so vital a resource as energy while at the same time mitigating as much as possible any adverse impacts on the community that such activities might incur. Other reports in this series include the following:

- #1 Preserving Surface Access to Underground Oil Reserves in Developed Areas
- #2 Fiscal Impact of Oil Operations in Huntington Beach
- #4 Enhanced Oil Recovery Technology
- #5 Solar and Conservation Policies at the Local Level

This publication was prepared with financial assistance from the U.S. Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, under the provisions of the Federal Coastal Zone Management Act of 1972, as amended, and from the California Coastal Commission under the provisions of the Coastal Act of 1976.

Definitions

This report necessarily discusses some technical aspects of oil spill planning. Consequently, some terms are used which may not be familiar to the reader. The following definitions section was prepared to help clarify the meaning of some of these terms. To ease reference, all words defined in this section are italicized the first time they appear in the report's text.

Boom - A mechanical device used to contain a spill on a water body by forming a barrier extending both above and below the surface.

Cash Bond - A cash deposit that will transfer to the City in case an oil handling company fails to comply with the Municipal Code; the transferred monies would be used for remedying the violation of the Code.

Estuary - A water passage where the ocean tides meet a river current; the mouth of a river.

Sewer - A pipe, conduit or other physical facility used to transport wastewater.

Skimming - A process of recovering spilled oil from the surface of the water.

Storm drain - A pipe or conduit which carries storm water, surface water, and street wash, but excludes sewage and industrial wastes.

Surety bond - A written contract between an oil company and a State licensed bond company to help guarantee the oil company's commitment to meeting the Municipal Code. If the oil company fails to comply with the Code, the bonding company is obligated to answer to the City and may be required to turn over all or party of the sum in the bond to pay for compliance with the Code.

1.0 Introduction

The Coastal Energy Impact Program (CEIP) provides federal funds to State and local governments to help them plan for and mitigate potential adverse impacts of increased energy-production activities in the coastal zone. Among the most serious potential impacts on the coastal zone are oil spills. This report, which is funded through CEIP, is concerned with oil spill contingency planning in and near the coastal zone.

Several major oil-related facilities are located in the City's coastal area (see Figure 1.1). Oil production platforms have been built offshore on the Outer Continental Shelf (OCS) and in State tidelands. Oil tankers unload their cargo at a nearshore marine terminal, and oil is stored in tank farms within the City. Pipelines carrying gas, oil and refined products lie under the City. A large power plant is located in the coastal zone, and another tank farm stores the fuel oil for that facility. Extensive onshore oil production also exists in the City's coastal zone.¹

Several small-scale spills from these facilities occur each year, and the continued transportation, storage, and production of petroleum and related products may result in future spills which could have adverse impacts on the City's shoreline. For example, oil leaks or spills can impede recreational and economic activities in the coastal zone. Environmentally sensitive areas, such as nesting areas for endangered species, could also be damaged. Residences and commercial establishments could face the possible hazards of fires and fumes, and owners could experience related problems such as the inconvenience of an evacuation in an emergency situation or of clean-up operations after a spill.

The prevention, containment and clean-up of oil spills involves all levels of government as well as oil companies. Each level of government has certain jurisdictional responsibilities and authority concerning spills and it is possible that the responsibilities overlap with another level of government. The goals of this report are

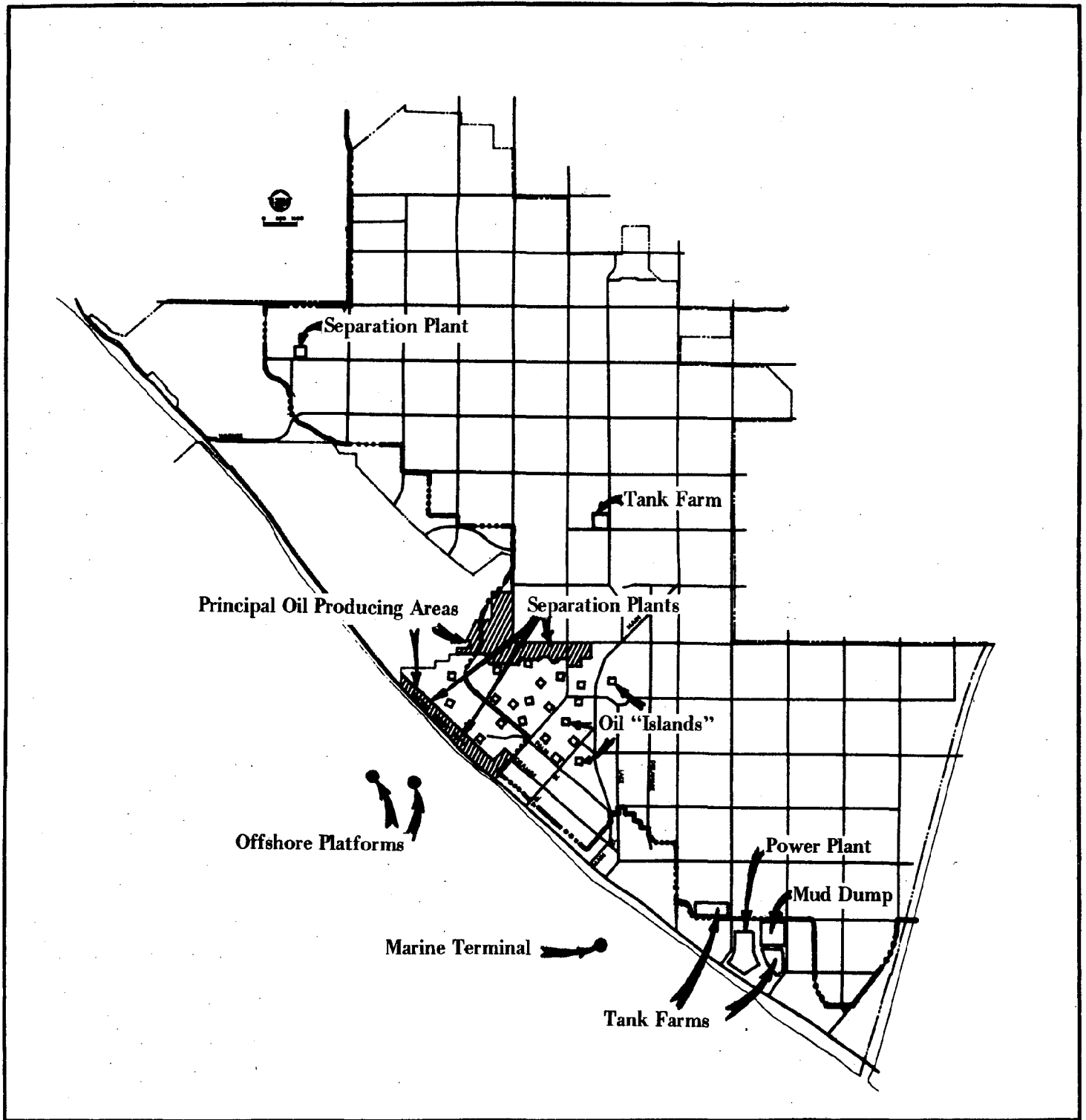


Figure 1.1 Energy Facilities in Huntington Beach
Source: City of Huntington Beach, Coastal Element

huntington beach planning division

1) to clarify the roles, capabilities and authority of federal, state and local governments concerning oil spills, 2) to review existing governmental oil spill contingency plans and identify, where appropriate, the role of the City's personnel and equipment, and 3) to recommend improved measures, if necessary, to ensure that important resources, including recreational beaches, waterways, residences, commerce and environmentally sensitive areas are adequately protected from spills.

Section 2.0 discusses, in general terms, the roles usually expected of the different levels of government during an oil spill. Section 3.0, discusses offshore spills and includes the following topics: 1) containment and clean-up strategies for beaches and at-sea oil spills, 2) equipment available for clean-up activity, and 3) specific sensitive areas within Huntington Beach. Section 4.0, discusses topics related to onshore spills, including 1) spill containment and clean-up strategies, 2) tank farms and adjacent areas, and 3) spill impacts on storm drains and sanitary sewers. Section 5.0 presents some conclusions and recommendations.

2.0 Oil Spill Planning, Prevention and Clean-up

Determining which agencies will be involved in containing and/or cleaning a spill depends largely upon the severity of the spill and its location. Figure 2.1 summarizes the general relationship among different levels of government for responding to oil spills.²

The following sections describe the roles and authority the different levels of government assume in a spill emergency and highlight how local government may interact with State and federal agencies.

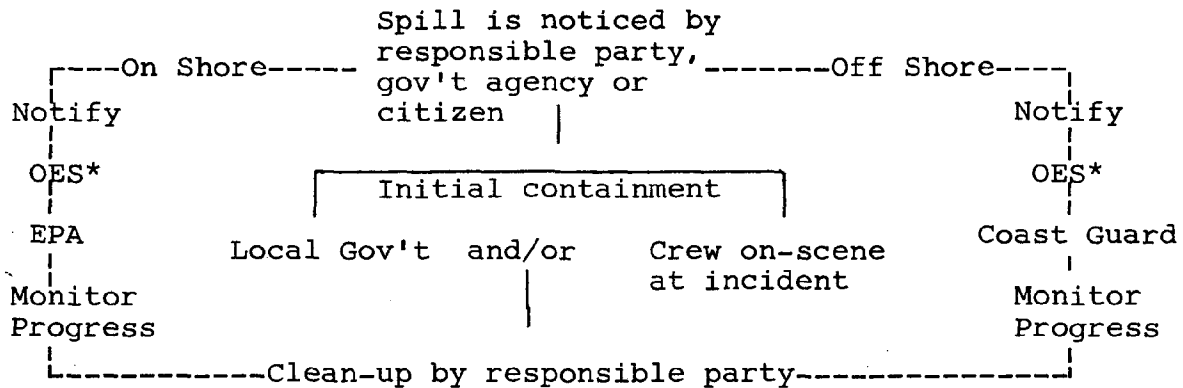
2.1 Federal Role

The Federal Water Pollution Control Act (FWPCA) includes provisions establishing the National Oil and Hazardous Pollution Contingency Plan (National Plan), a nationwide system of regional contingency plans and federal policies for oil spill containment and clean-up procedures. Under the national plan, an On-Scene Coordinator (OSC) from the Coast Guard or Environmental Protection Agency (EPA) can be sent to a spill to monitor and/or direct clean-up efforts. The Coast Guard is

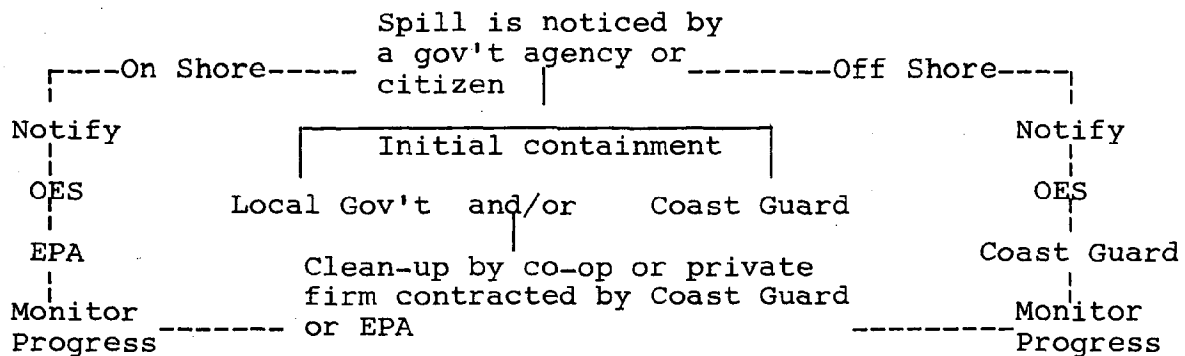
responsible for coastal and navigable waters and the EPA is responsible for inland spills.³

The National Plan divides the country geographically into regions for the purpose of spill planning. Within each region is a Regional Response Team (RRT) which develops its own Oil and Hazardous Pollution Contingency Plan to provide a coordinated response by federal, state and local agencies. The RRT's plan is activated when there is a major spill or when the potential for such a spill occurs. The team is comprised of representatives of federal and state agencies, and some local governments. Each agency is allowed one member and at least one alternate. The On-Scene Coordinator (OSC) designated by the RRT acts as the federal OSC for the spill incident in accordance with the national plan. The RRT is jointly chaired by the Coast Guard and EPA except during a spill emergency at which time the agency in whose jurisdiction the spill occurred will head the team.

IF SPILLER IS KNOWN:



IF SPILLER IS NOT KNOWN:



*State Office of Emergency Services; they will notify other federal and state agencies



Figure 2.1 Organizational Hierarchy for Oil Spill Planning

Source: Huntington Beach Planning Division

huntington beach planning division

When not activated, the RRT serves as a standing committee to 1) review regional emergency response operations and equipment to ensure preparedness, 2) review the OSC's functions to ensure regional plans are developed and coordinated with involved agencies, 3) promote coordination among all levels of government and private agencies, and 4) recommend and implement policy changes.⁵

A revolving fund has been established by the FWPCA to pay for expenses incurred during clean-up operations when the spiller is unknown or not taking appropriate clean-up action. The fund is under management of the Coast Guard; federal OSC's, whether Coast Guard or EPA, have access to the fund. Once the spill is cleaned, the responsible party, if known, is billed for the expenses.

"Strike Teams" are also available to the OSC under the national plan to provide assistance and technical advice as needed during a major spill. The teams include: 1) the National Strike Force established and maintained by the Coast Guard with expertise in communications, damage control, oil and hazardous substance removal, (the Pacific Strike Team, located in San Francisco, is responsible for spills in California); 2) the Environmental Response Team established by EPA with expertise in biology, chemistry, and engineering, and 3) Scientific Support Teams, organized by EPA and the National Oceanic and Atmospheric Administration to provide scientific expertise in oceanography, locating environmentally sensitive areas, and assessing environmental damage. Once activated, a team can be on the scene of a major spill in this area within four to six hours.⁴

2.2 State Role

California has an Oil Spill Contingency Plan that can operate simultaneously with or independently from the national plan. The objectives of the State plan are to

coordinate actions of State agencies and to provide local governments, the public and news media with information regarding the spill.

The State plan establishes a State Interagency Oil Spill Committee (SIOSC) composed of several State agencies.⁶ SIOSC designates a State Agency Coordinator (SAC) who is responsible for administering the State plan. The plan also establishes a State Operations Team (SOT), headed by the SAC, which also consists of several state agencies.⁷ The SOT does not have funds available to clean a spill, but personnel and equipment are available from various state agencies during an emergency.

The State's operations team owns very little clean-up equipment and relies on other parties, such as the oil companies, other private contractors or, occasionally, federal and local agencies to conduct the actual clean-up. The State Contingency Plan also recognizes the importance of local government involvement and encourages communities to prepare their own plan which will coordinate with the State and national plans. The State plan acknowledges that the federal government is the lead agency during the containment and clean-up process of a major spill.

California is currently revising this oil spill plan with funding from a Coastal Energy Impact Program grant. The purpose of the revision is to clarify the State's responsibility during a spill, to improve coordination with local governments and to establish better containment and clean-up procedures for spills of hazardous substances other than oil.

2.3 Local Role

The role of local governments in a spill emergency focuses on 1) discovery and evaluation of the spill, 2) immediate action to limit damage and protect the public, 3) notification of appropriate state and federal agencies, and 4) providing support for clean-up operations by private industry.

Both the federal and State plans stress the need for municipalities to initiate the containment process, especially with onshore spills. On the other hand, municipalities are rarely involved with spills at sea and, if the spill does come ashore, the local government may not have the needed equipment for effective clean-up and may have to wait for assistance from the Coast Guard.

County Plan: The County of Orange has developed a Hazardous Material Response Plan for oil and toxic chemical spills. The plan is intended to be a planning guide based on the mutual aid concept, (that is, providing the affected local jurisdiction with additional support from higher levels of government and other municipalities as needed or requested). According to the plan, the spill is the responsibility of the affected jurisdiction, and the local fire department is assumed to be the lead agency in controlling the incident.

If the fire department determines that the situation is beyond its scope and capabilities, county support and resources will be requested. When the situation is beyond the scope of both the city and county, State and federal assistance will be requested. However, control will be maintained by the jurisdiction where the incident occurred.

The term "control" is not defined in the county plan but it appears to mean "lead agency". Consequently, the county plan contrasts with the State and national plans which recognize either the EPA or Coast Guard as the lead agency for spill response.

Spill Plans in Huntington Beach: The City's primary functions in case of a spill are to contain the spill, to ensure public safety and to limit damage. The actual clean-up process is usually undertaken by the responsible party or a private firm. The City divides the responsibility of overseeing the containment and cleanup of oil and hazardous spills between the Community

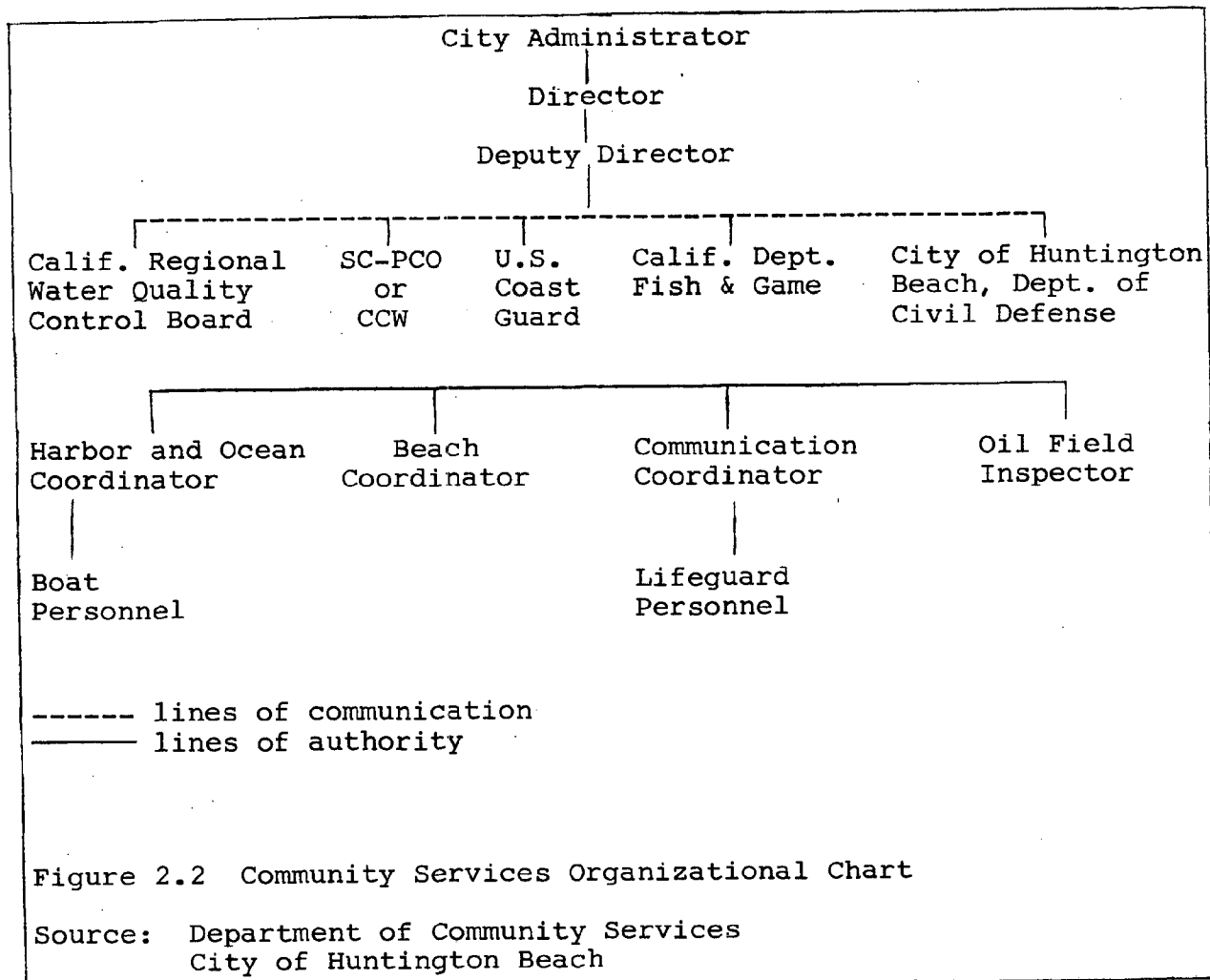
Services and Fire Departments. Generally, Community Services is responsible for spills involving the shoreline, the harbor or any saltwater area, and the Fire Department is responsible for spills on land. Because of this division of responsibility, the City has two plans related to oil spills: the "Civil Defense/Emergency Services Plan" for Community Services and an "Incident Command System - Operational Guide" for the Fire Department.

The Community Services' "Emergency Services Plan" is compiled from various operational plans for different emergency situations. O-Plan 16, "Major Oil Spills" outlines assignments, defines different categories of spills and establishes operating instructions for other departments within the City, should they become involved. The Director of Community Services is designated as the Incident Officer who oversees the entire incident within the City. He or she is responsible for assigning actions based on the situation and on information provided by the Coast Guard, which is recognized as the coordinating agency for all offshore spills.

Spill situations are evaluated to determine which of the following responses are most appropriate: 1) to correct or eliminate the cause of the spill, 2) to divert and/or minimize the effects of the spill and 3) to begin recovery operations.

A simplified staff organizational chart is shown in Figure 2.2 which highlights the responsibilities within the Department and outside agencies notified in case of a spill. (Detailed operating instructions for other city departments are outlined in O-Plan 16 which is available upon request.)

The Fire Department Incident Command System (ICS) is a standardized system used for six emergency situations including all hazardous materials spills. In conjunction with the ICS, the department has an operation plan for Chemical/Hazardous Materials - Leaks and Spills (O-Plan 4).



O-Plan 4 provides a formalized check sheet for procedures to minimize adverse impacts from leaks or spills of chemical or hazardous materials, including oil.

Although the department informs other agencies of a spill, it generally operates independently from the county, state and federal agencies during the containment process. The Fire Department assumes responsibility for these kinds of emergency situations within the City as a part of their day-to-day duties. If the Fire Department cannot contain the spill, assistance is requested through the county's mutual aid system.

Cost Recovery: The spiller, if known, is financially responsible for containment and clean-up of spills. If the spiller is not known or does not respond quickly enough, the City will begin containment of the spill. In such cases, the responsible party is billed later for the City's time and services. To date, establishing responsibility for onshore spills or collecting payments for City services has not been a problem.⁸

In order to be reimbursed through the national revolving fund for services related to containment and/or clean-up of an onshore spill or an offshore spill that washes ashore, the municipality must notify the federal OSC of its request. Before monies may be drawn from the revolving fund, the

OSC must determine that the following conditions have been met: 1) oil has been discharged into U.S. waters or an adjoining shoreline, and 2) the responsible party has been given legal notification of improper or inadequate action and has failed to voluntarily conduct adequate clean-up action, or the spiller is unknown.

Individuals who suffer damage to personal property and businesses losing earning capacity as a direct result of the spill may be eligible for compensation. Damages for intangible losses, such as aesthetics, are restricted to real property owners whose property interests were physically harmed.

Requests for reimbursement must be submitted to the OSC or SAC. Requests must be clearly and completely documented and directly related to costs incurred during the clean-up operation.

Following the Santa Barbara oil spill in 1969, several lawsuits concerning reimbursement for loss of business earning capacity, damage to property, and intangible losses were filed. Some interesting findings resulted from these cases. Damages for recovery of economic loss were limited to waterfront property directly affected by the spill; businesses which had a decline attributable to the spill, but which were not physically affected by it, were not able to recover the loss of profits. State and local governments were able to recover damages for loss of proprietary income, such as fees paid by park visitors, concessionaire and leasehold income. However, the right of governments to recover damages for marine environment and tax revenue losses were contested.⁹

Bonds

The City of Huntington Beach requires a *surety bond* of \$10,000 for each oil well within the City. The purpose of the bond is to secure the City against all costs, charges and expenses incurred if the oil company does not fully comply with the Huntington Beach Municipal Code.

To date, bonds have only been used for safely plugging improperly abandoned wells;

however, it is possible to apply the bond to any section of the Municipal Code, including spill prevention and clean-up. A problem with surety bonds is that unless the operator agrees to the charges of wrongdoing, the City must sue the operator in Superior Court to collect money from the surety company. This can be a lengthy process.

Alternatives to surety bonds which the City may want to consider are *cash bonds*. This system would require operators of oil wells to have an agreed upon sum of cash to which the City would have access in case a violation in the Municipal Code were not corrected or eliminated. A major problem with cash bonds is that requiring large sums of money to be held in escrow accounts may be too burdensome for small independent operators. By using surety bonds these operators arrange with bond companies to "insure" them for the required sum. If cash bonds were required, each operator would have to put up that sum independently.

2.4 Industry Role

Although the focus of this discussion is on government spill contingency plans and on the role of the local government in spill emergencies, it should be recognized that the oil companies themselves have the most significant role in spill prevention and clean-up. The "spiller," that is the private company which owns the facility from which the accidental spill originates, is usually responsible for containment and clean-up, and is liable for direct damages caused by the spill. The federal government also requires the operators of major oil handling facilities to have a Spill Prevention Control and Countermeasure (SPCC) plan if oil could be discharged into navigable waters or adjoining shorelines; (these are discussed again in section 4.0).

These plans typically include information on the types of oil handling facilities on-site, the kinds and amounts of fluids that might be spilled in an accident, containment equipment and procedures, and requirements for notifying public agencies involved in monitoring containment and clean-up

operations. Many plans also require periodic drills to ensure that containment, clean-up and notification procedures are effective. Some plans discuss the resource areas that might be affected by a spill and prescribe special protection measures for especially sensitive areas.

All of the major oil companies in Huntington Beach have SPCC plans. Aminoil's plan covers their onshore lease areas as well as their offshore platform. Chevron has a plan for their onshore production areas. Gulf has two plans, one for its offshore tanker unloading terminal and one for its onshore tank farm. Union and Shell also have SPCC plans for their offshore platforms.

Southern California Edison stores and transports considerable quantities of fuel oil. The Huntington Beach generating station site is broken into two major components, the System Fuel Oil Facility and the Generating Station proper. SPCC plans exist for both areas. The Edison facility is discussed further in Section 4.0.

2.5 Conclusion

In most cases, the responsible company will contain and clean the spill. In addition, all three levels of government may be involved, each having two or three agencies representing the interest of a particular functional area (e.g., water, air, or marine life). The location of the spill, amount spilled, the potential danger and the threatened resources will often be deciding factors for determining which agencies become involved. Most of the agencies do not actually assist with clean-up activity, rather they observe to ensure that the interest they are responsible for overseeing is adequately protected.

Municipalities have several options available to recover expenditures related to spills. These include: 1) billing the responsible party, 2) using the national revolving fund if the OSC has determined that the requirements for tapping this fund have been met, and 3) attempting to collect on surety bonds. In Huntington Beach, the City has billed the responsible party for excessive costs related to containment and clean-up, a practice that has generally been effective in recovering such costs.

3.0 Offshore Spills

Oil spills and leaks in offshore waters are impossible to predict. The cause of a spill is not always known, especially with the smaller spills of one or two barrels. Sources of spills include equipment failure, oil and gas well blowouts, tanker operations, pipeline leaks, accidents caused by human error and by natural phenomena such as earthquakes and storms.

Oil spills can adversely affect several important resources. The following briefly describes the principal impacts which could occur in Huntington Beach.

1. Air quality is affected when hydrocarbons evaporate from the surface of the spill. This impact tends to be short term, disappearing when the oil sinks or is cleaned up.
2. Water quality is degraded when hydrocarbons float on the surface and the oil mixes through the water, usually a short term impact.
3. Marine mammals and fish usually avoid the spill, and therefore are not severely affected. Increased hydrocarbon concentrations in fish food chains may affect some species; the eggs and larva of fish tend to be killed. The extent of adverse effects on plankton and invertebrates is not clear. However, these impacts tend to be short term and localized.
4. Birds, for the most part, will avoid spills. However, certain species which normally catch fish by swimming or diving into the ocean are particularly susceptible. These include grebes, loons, cormorants, and alcids. Their feathers can be coated with oil which impedes their swimming and flying ability. Birds may also be poisoned when attempting to clean the oil from their feathers.

5. Habitat areas used by birds and other wildlife could be affected. Their food may be contaminated by the spill and breeding habitats disturbed by the noise from equipment used to contain and clean the spill. These impacts could be long term.
6. Beaches would be affected in two ways: 1) recreation activities may be curtailed and 2) intertidal sand habitat for crabs, clams, and worms may be damaged. These impacts would generally be short term.

Several documents discuss these impacts in detail and should be referred to for further information.¹⁰

3.1 Spill Clean-up and Containment

Containment and Clean-up Methods: The method used to contain and clean-up offshore spills will depend on several variables such as: 1) location, size and source of the spill, 2) weather conditions, and 3) currents and tides.

The first priority is to contain the spill or mitigate its effects at sea. The techniques commonly employed are *booming*, *skimming* and, occasionally, the use of chemical dispersants. A boom is a floating barrier, extending both above and below the water surface, which corrals and confines the spill (see Figure 3.1). Booms perform most effectively when the wind and ocean are calm. Choppy waters and strong winds tend to push portions of the oil slick over the boom barrier, reducing its effectiveness.

Skimming is a process of recovering spilled oil from the water once it has been contained. There are three general types of skimmers: 1) Weir skimmers that depend on gravity to drain oil off the water surface into a sump below the surface; these are simple to use and extremely mobile, but their efficiency decreases in choppy waters. 2) Floating suction skimmers which employ a suction pump as opposed to gravity; these are adjustable and can be calibrated to operate just at the water/oil interface. Again, their effectiveness is reduced in choppy waters. 3) Sorbent surface skimmers, which provide a surface to which the oil can adhere, allowing the oil

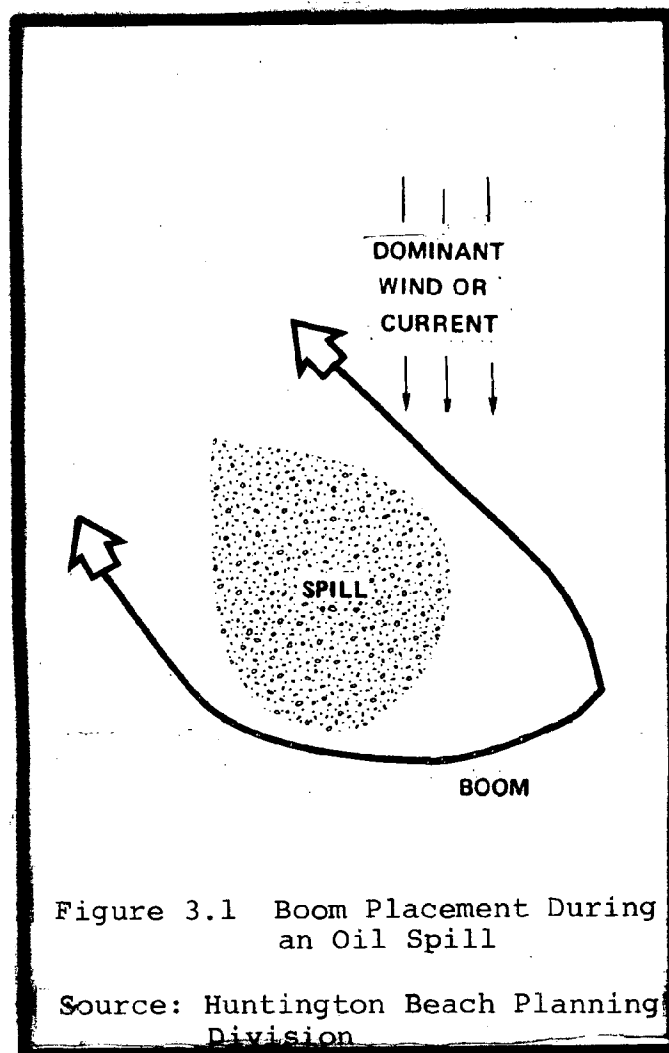


Figure 3.1 Boom Placement During an Oil Spill

Source: Huntington Beach Planning Division

to be removed from the water. These skimmers employ a disc, drum or continuous belt and are less susceptible to wave action than the weir and suction types. However, they are generally more expensive, harder to obtain and require highly trained personnel to operate.¹¹

In some cases, chemical dispersants are used to slow the movement of the oil and to reduce its volatility or toxicity. Dispersants break down the oil so it can mix vertically through the water column, thus decreasing its toxicity and mobility. Because of the controversy concerning the effects of dispersants, California and federal authorities have adopted regulations restricting, but not prohibiting, their use.¹² Approval is required from the California Department of Fish and Game and the EPA or Coast Guard before chemicals can be used.

If the spill cannot be contained at sea, oil may drift toward the shore. In these circumstances diversion booming -- that is, using booms to divert the oil to a section of the shoreline where damage is minimal and access for clean-up is good -- may be employed. Generally speaking, it is preferable to divert the spill to a sandy beach with good access, while avoiding rocky areas, wetlands, and areas that lack access for clean-up equipment and workers. Section 3.2 discusses the areas in Huntington Beach where spilled oil should not be landed if at all possible, as well as those areas where adverse impacts can be minimized and clean-up can be performed more easily.

If the spill lands on shore, discing, plowing and turning over the oily sand may be performed. The oil may also be removed by absorbents and adsorbents. Absorbent materials soak up oil while adsorbents provide surfaces for the sticky oil to cling to, allowing subsequent removal. Straw, foamed plastics, cotton waste, talc and dried volcanic rock are often used to help clean up oil from the shoreline.¹³ These materials reduce the amount of oil in the sand and assist with the discing technique. After a large spill, however, discing is usually ineffective and the sand may have to be removed. This method is therefore used primarily for small spills.

In Huntington Beach, the affected beach area is not closed to the public after a spill unless there is a high concentration of oil, or unless heavy equipment poses a hazard to public safety. In most cases the Community Services Department uses mobile units to inform beach patrons of the spill, advising them to avoid the impacted area until clean-up is completed.

Local Equipment Resources

The City of Huntington Beach has specific equipment that could be used in the event of a minor offshore oil spill that washes onshore. Although it does not have the equipment or manpower to conduct a major clean-up operation, the City can provide initial containment and protection prior to

the arrival of specialized personnel and equipment, and can assist responsible parties involved in the clean-up operation, even in the case of a major spill.

In the event of an oil spill, City equipment normally used for day-to-day operations in Fire, Police, Community Services, and Public Works Departments will be made available upon request. Equipment includes:

- a fleet of cars, pickups, vans, jeeps and trucks
- tractors, trailers, caterpillars, and vacuum sweepers
- police mobile command unit bus and helicopter
- rakes and discs used for discing oil on sandy beaches

Co-Op Equipment Resources

The National Plan requires the party responsible for the oil spill to undertake the clean-up operation under the supervision of the U.S. Coast Guard. Oil companies are required by federal regulation to have booms and skimmers available at offshore drilling sites and platforms with the capability to contain small (less than 238 barrels) and medium (less than 2,381 barrels) size spills. For any spill beyond the capacity of on-site containment equipment, oil company cooperatives have been established to clean-up major spills.

Thirteen West Coast cooperatives have been established to prevent, contain, and clean spilled oil. Clean Coastal Waters (CCW) and the Southern California Petroleum Contingency Organization (SC-PCO) are the cooperatives for the Los Angeles-Orange County shorelines. Members of the co-ops generally include offshore producers and other potential spillers. They pay an annual fee based on their level of offshore activity. The funds are used to purchase specialty equipment not expected to be owned by individual member companies and to train industry personnel to use the equipment. In the event of a spill, the cooperative will deliver any equipment requested.

The equipment is also available to non-member companies upon request from the Coast Guard, and a fee is charged to the non-member company.

The available offshore equipment includes boats, booms, chemical dispersants, aircraft, skimmers and other vessels.

Disposal Sites

The disposal of recovered oil and oil-contaminated materials can pose immediate and long range problems. Occasionally, oil/water mixtures can be separated in treatment tanks at local oil production facilities and the recovered oil sent to a refinery.

In most cases, however, the disposal of oil and contaminated debris is more complicated. Legal requirements for disposal are established by the California Regional Water Quality Control Board. Oil contaminated wastes cannot be burned, but must be buried safely on land in Class I disposal sites.

According to the Board, Orange County does not have a Class I site which would be impermeable to stored oil. The nearest suitable landfill is in West Covina, approximately 50 miles from Huntington Beach. The lack of suitable disposal sites may be a very serious impediment to effective oil spill clean-up in this area.

3.2 Sensitive Areas: Huntington Beach

Many resources can be affected by offshore spills. Although the entire coastline is susceptible to oil spill damage, certain areas are more susceptible and sensitive to damage because of environmental impacts, economic and recreational disruption, or difficulty with clean-up operations.

This section discusses the following areas which may be impacted by offshore oil spills in Huntington Beach.

- Santa Ana River Estuary
- Anaheim Bay/Huntington Harbour

- Bolsa Bay/Bolsa Chica Ecological Reserve
- Beaches within Huntington Beach and the Municipal Pier
- Southern California Edison Cooling Water Intake System (offshore)

Santa Ana River Estuary

The Santa Ana River empties into the ocean between Huntington Beach and Newport Beach. A flood control channel also discharges into the ocean, parallel to the Santa Ana River. A lowland, marsh-like area extends upstream along the flood control channel. A debate has ensued over whether or not this area is a functional wetland. Further study and a final determination by the Coastal Commission may be necessary.

Marshes and wetlands provide both economic and environmental benefits. They provide shelter and food for migratory birds as well as nesting and habitat for residential species. Some lowlands and *estuaries* are breeding grounds for commercial fish and invertebrates. Wetlands may also protect against flooding to some extent by trapping excess storm waters and thereby recharging the groundwater table.

The dominant vegetation in the lowlands near the Santa Ana River is pickleweed, although other plant species are present. Portions of the lowlands are used for nesting by the Belding's Savannah Sparrow, an endangered species. This lowland area does not have direct tidal flushing, and this limits its biological productivity. However, improvement measures could be taken to increase productivity. The river mouth itself is the feeding area for the California Least Tern, also an endangered species.

Protection of the Santa Ana River and flood control channel are a high priority. Booming will be the most effective method of protection. Separate booms will be needed for the river and the flood control channel. Placement of the boom will be inland of Pacific Coast Highway because wave action near the ocean entrance will

reduce the effectiveness of the booms. Vehicle access is available on service roads (see Figure 3.2). If clean-up is necessary, low pressure water flushing is recommended.¹⁴

Small boat access is possible from the shorelines of Huntington State Beach or Newport Beach.

Anaheim Bay/Huntington Harbour/Bolsa Bay/Bolsa Chica Ecological Reserve

Anaheim Bay lies just northwest of Huntington Beach (see Figure 3.3). Channels from the Bay connect the Seal Beach Wildlife Preserve, Sunset Aquatic Park and Huntington Harbour. Huntington Harbour is an 860-acre residential development oriented around a network of manmade water channels. It is adjacent to the Seal Beach Wildlife Refuge and Bolsa Bay. Protection of this area is a high priority.

The entrance to Anaheim Bay is always open; therefore, its protection should be a high priority. Boom placement across the channel can serve as the primary containment measure; see Figure 3.3. However, secondary booms may be needed at the entrances to Huntington Harbour and Seal Beach Wildlife Refuge if the oil is not fully contained by the first boom.

The north bank can be reached by an unnamed road into the Naval Weapons Station via Seal Beach Boulevard, south of Pacific Coast Highway. The south bank may be reached by Pacific Coast Highway. Each approach requires passage through a gate controlled by the Navy, and allows ample room for storage of equipment and supplies.¹⁵

Bolsa Bay, located southwest of Huntington Harbour, is connected to Anaheim Bay by a narrow channel. Within the bay is Bolsa Chica Ecological Reserve which consists of 563 acres adjacent to the City's coastal zone, inland from Bolsa Chica State Beach. Sections of the marsh have been reflooded in an effort to restore the wetlands habitat.

The Reserve is valuable because it provides 1) breeding and "nursery" areas for marine species with commercial and recreational value, 2) habitat for various wildlife species, including rare and endangered species, 3) natural flood control, and 4) aesthetic amenities. The protection of scarce ecosystems is recognized in the California Coastal Act as an important greater-than-local goal. At this time, the Reserve is not likely to be affected by an offshore spill because of its distance from an ocean entrance. However, the County of Orange Local Coastal Plan (LCP) has proposed a channel which would open the Reserve to the ocean waters. If this plan were pursued, the Reserve would be much more susceptible to offshore spills and would warrant the highest priority of protection.

If the oil cannot be completely contained by the primary boom located at the entrance to Anaheim Bay, clean-up may be necessary in other sections of the bays and channels. Booms and skimmers may be used to collect oil spreading into Anaheim Bay and Huntington Harbour. Many clean-up techniques in the marshes themselves may be more environmentally detrimental than the oil itself due to destruction of wildlife habitat by mowing and trampling. Low pressure water flushing with small boats may be an acceptable, if not highly effective, technique for removing some of the oil entering the marsh.¹⁵

Beaches

The City's shoreline stretches over nine miles, encompassing approximately 380 acres of beaches. Sandy areas are used year round for swimming, sunning, fishing, surfing, clamming and camping. A major spill reaching the shoreline would disrupt these numerous recreational activities. Spill containment and clean-up strategies are explained in Table 3.1. The following section describes the beaches within Huntington Beach beginning with the north end of the City (see Figure 3.4) and discusses a priority for protection in case an offshore spill must be diverted to the shoreline.

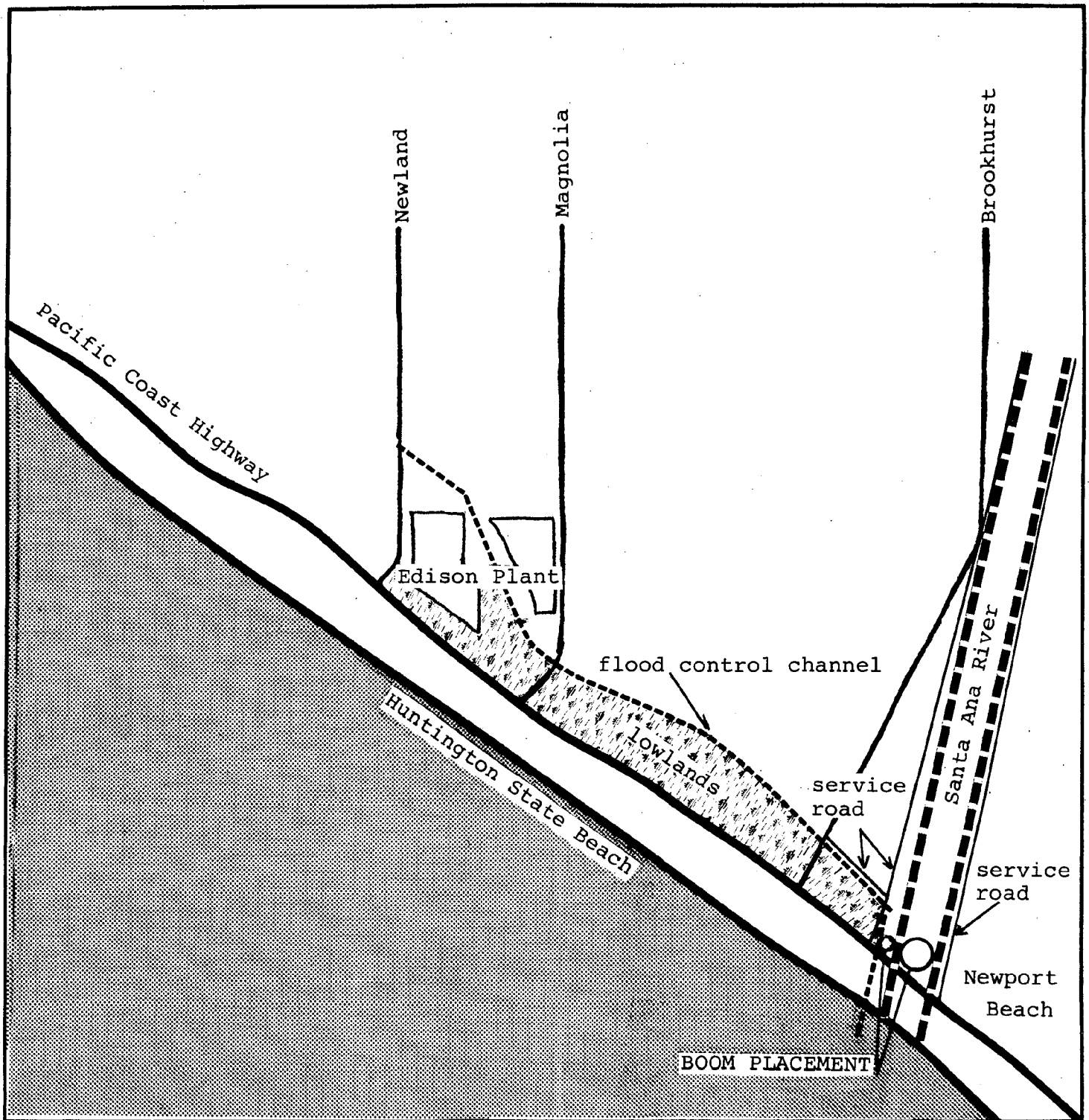


Figure 3.2 Santa Ana River Boom Placement
Source: Huntington Beach Planning Division

huntington beach planning division

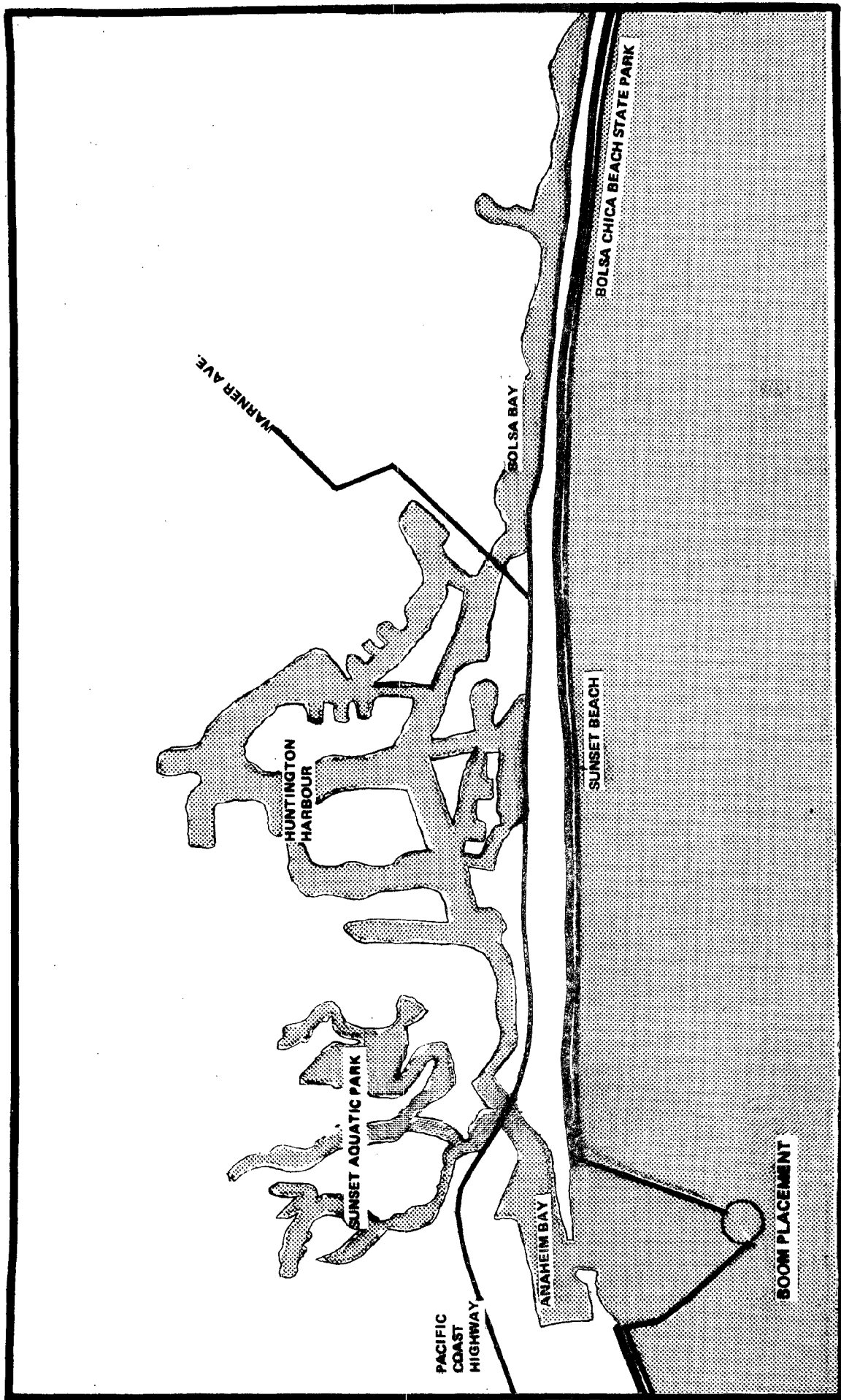


Figure 3.3 Anaheim Bay Boom Placement
Source: Southern California-Petroleum Contingency Organization



huntington beach planning division

TABLE 3.1

ALTERNATIVES IN OIL SPILL CONTAINMENT AND CLEANUP WITH DIFFERENT BEACHES

PROTECTIVE STRATEGY	FIRST PREFERENCE	SECOND PREFERENCE	THIRD PREFERENCE	FOURTH PREFERENCE	FIFTH PREFERENCE	CRITERIA FOR COMPLETION OF CLEANUP
BEACH TYPE						
Rock Face	Prevent stranding. Contain and skim or contain and divert to sand beaches	Disperse offshore before stranding	Mop up stranded oil with absorbent pads or materials	Displace by high pressure (1000 lb/in ²) cold water; start at low tide and work up as tide floods; mop at strand line as tide recedes	Permit natural weathering and dispersal	Remove gross contamination (residual stain permissible)
Sand	Prevent stranding. Contain and skim or contain and divert to sand beaches	Disperse offshore before stranding	Rake up stranded oil or capture with pads	Bury by disc or suitable technique to cover oiled sand	Permit natural weathering and dispersal	Remove all visually evident traces of sand on beach or bury to prevent exposure
Wetlands, Bays, Estuaries	Prevent entry with booms or by containment	If oil enters these areas, it may be contained and stranded on the most appropriate beach	Only in extraordinary circumstances would burial be considered			Cleanup where possible and not disruptive of natural resources

Acceptable cleanup of spilled oil will result in a gradation from visually evident residual contamination to no apparent contamination.

Every effort must be made to keep oil from stranding on rocky areas and to quickly clean it from sandy areas.

Birds contaminated with oil must be isolated, boxed, and transported to cleanup and rehabilitation facilities, e.g. Marineland, Department of Fish and Game, Municipal or County Animal Shelter, the Orange County and Los Angeles Zoos.

SOURCE: County of Los Angeles, Oil Spill Contingency Plan

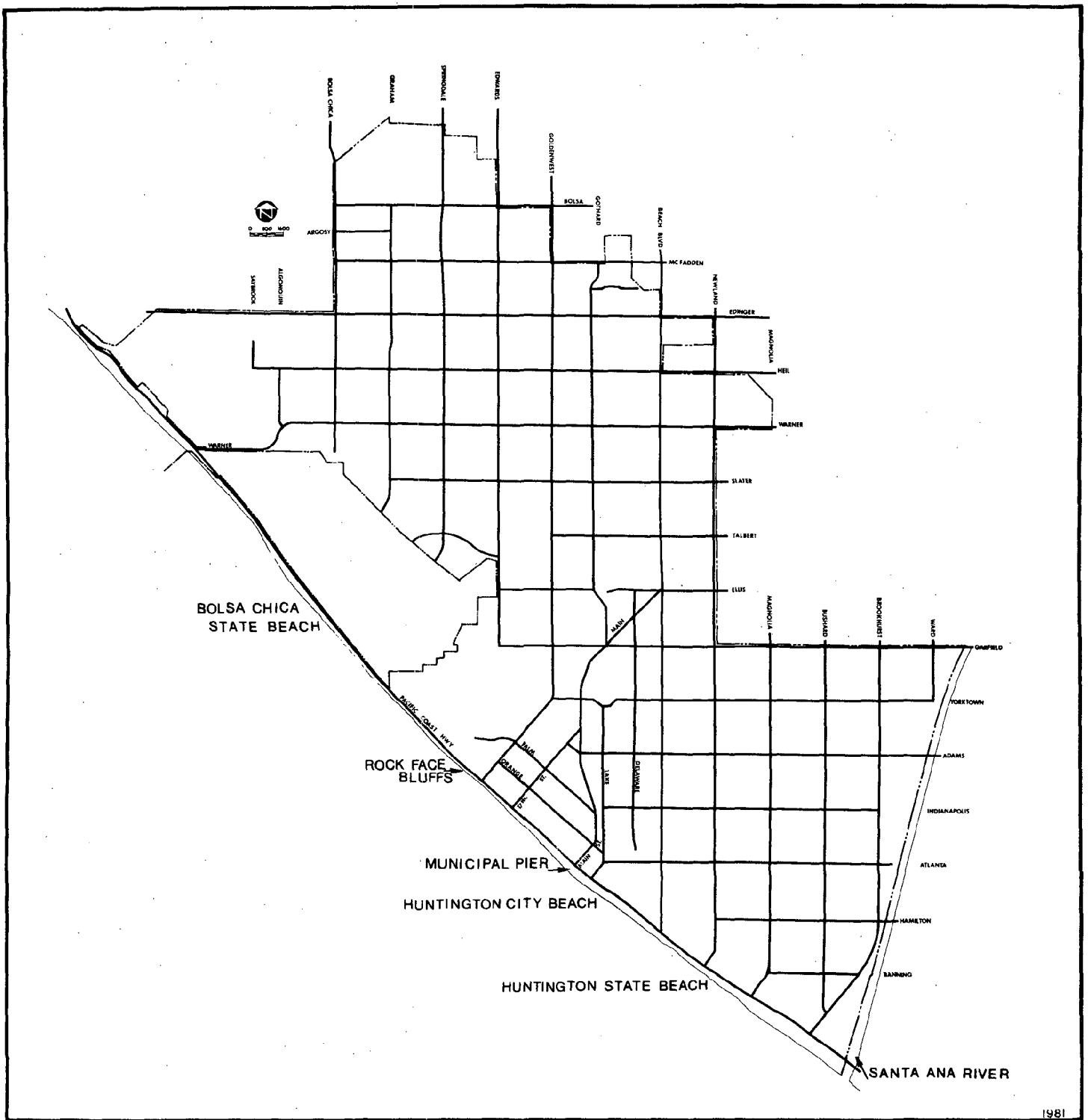


Figure 3.4 Beaches Within Huntington Beach
Source: Huntington Beach Planning Division

huntington beach planning division

Bolsa Chica State Beach includes six miles of shoreline between Warner Avenue and the Municipal Pier. Approximately three miles are developed with recreation facilities and further development is planned. The beach experiences heavy recreational use throughout the year. Entrance to the State Beach is from Pacific Coast Highway. Vehicle access is available along a road inside the State Beach; the beach itself connects with Sunset Beach and access is afforded via the sand. Further vehicle access is possible from Pacific Coast Highway (see Figure 3.5.).

Within the State Beach beginning at Goldenwest Street and extending approximately one mile north, steep bluffs rise above a narrow sandy beach. During the high tide, water washes against the bluffs which would limit access for clean-up equipment. Cleaning a rock face is much more difficult than a sandy shoreline. For these reasons, the rocky areas should be avoided in case of an oil spill.

Huntington City Beach includes approximately one mile of sandy shoreline between the Municipal Pier and Beach Boulevard. Recreational intensity and economic activity are high and warrant priority protection measures. The municipal pier is located on this beach. The area immediately surrounding the pier is heavily used for recreational purposes, such as swimming, surfing and fishing. Due to the large amount of recreational use and the difficulty of cleaning the pilings, the pier should be especially protected in case of a spill.

Huntington State Beach encompasses the two mile area between Beach Boulevard and the Santa Ana River. Vehicle access is possible along a road inside the State Beach, entered at the intersection of Pacific Coast Highway and Beach Boulevard.

This beach includes a five-acre California Least Tern nesting preserve adjacent to the river. The sensitivity of the nesting preserve warrants a high priority protection. Even if the oil does not directly reach the nesting area, the clean-up activity

nearby could disrupt the nesting behavior of this endangered species. Diversion booming should be used to keep the oil as far away as possible from the preserve. If a spill were to land in this area during the nesting season, adverse effects of clean-up activity on the nesting birds should be assessed prior to permitting such activity.

Both State Beaches and the City beach can be used, if necessary, to launch small boats for spill containment.

Southern California Edison Cooling Water Intake System

The Southern California Edison generating plant collects ocean water for cooling purposes through a pipe which extends approximately 1.3 miles offshore, twenty feet below the surface.

The ocean water remains in the pipe through the entire cooling process, and does not mix with the plant's own water. The purpose of the ocean water is to cool vapors and condense them back to a liquid. The cooling water is used once and then returned to the ocean.

The City has discussed with the Edison Company the possibility that oil spilled offshore might be drawn into the cooling system, fouling the mechanisms and forcing closure of the plant. Edison officials agreed that a potential problem exists. They have explained that if the quantity of oil entrained is small, no immediate effects may be noticed. However, continuous exposure to oil would foul the heat exchange and associated equipment, requiring partial or total shutdown of the generating station to perform clean-up activities.

Conclusion

If an offshore oil spill which cannot be contained at sea threatens an area which is sensitive or difficult to clean, diversion booming, if possible, should be used to direct the spill to another shoreline location. In most circumstances, the oil slick will do the least damage if it lands at a sandy beach with good vehicle access.

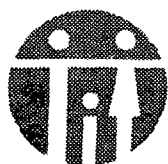
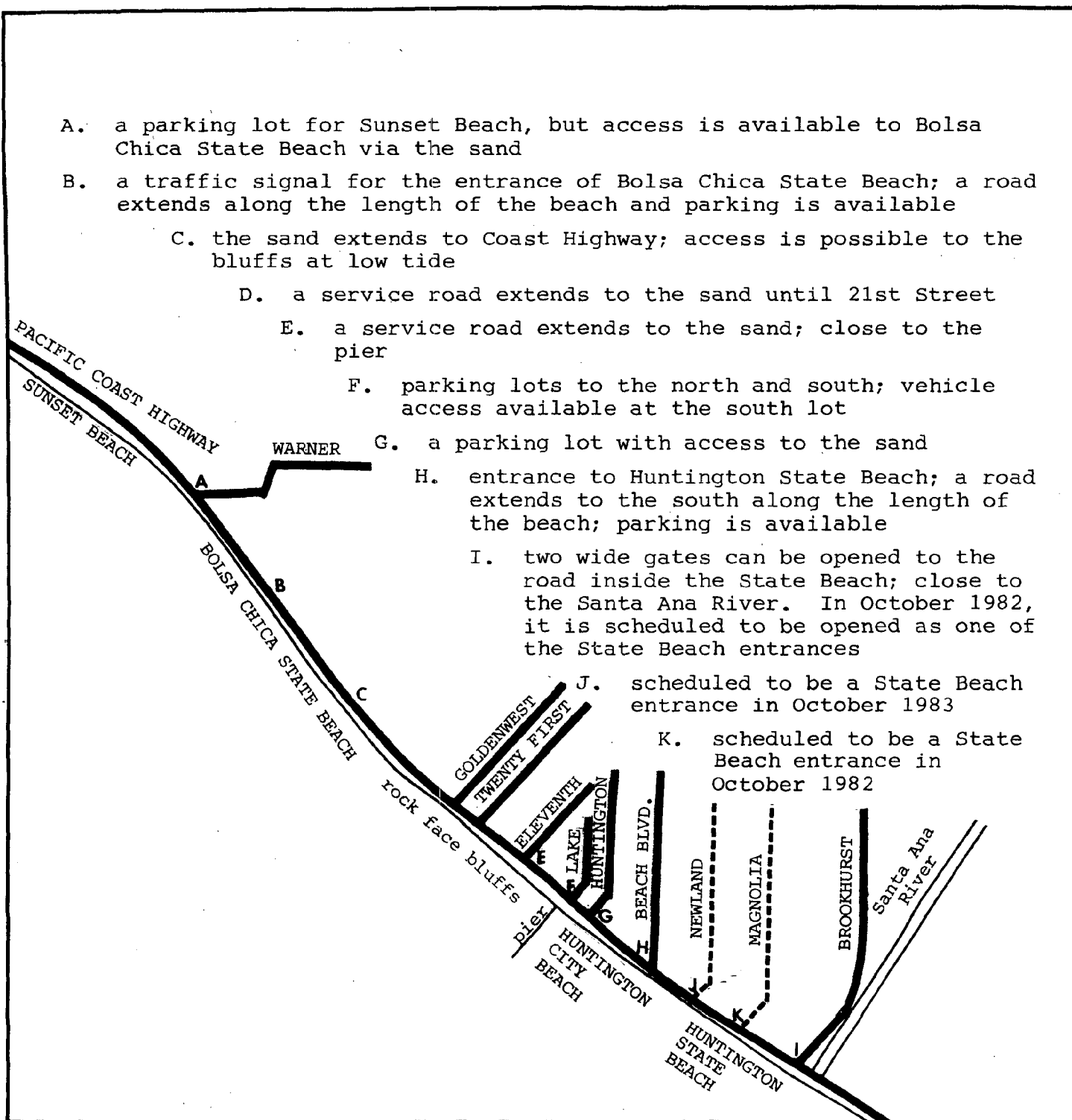


Figure 3.5 Vehicular Access Points to Beach
Source: Huntington Beach Planning Division

huntington beach planning division

The highest priority for protection should be given to the Least Tern nesting preserve and estuaries because of their wildlife habitat value. Next in priority for protection are

the municipal pier because of its high recreation use and the rocky bluffs because of the difficulty with their clean-up.

4.0 Onshore Spills

Onshore spills include all spills and leaks on land. There are numerous facilities in Huntington Beach which store, transport and process oil and related fluids. Accidents, human error and equipment or material failures can result in spills from these facilities. Approximately three such spills or leaks are reported in Huntington Beach each year. Most of these are very small, amounting to less than a barrel.

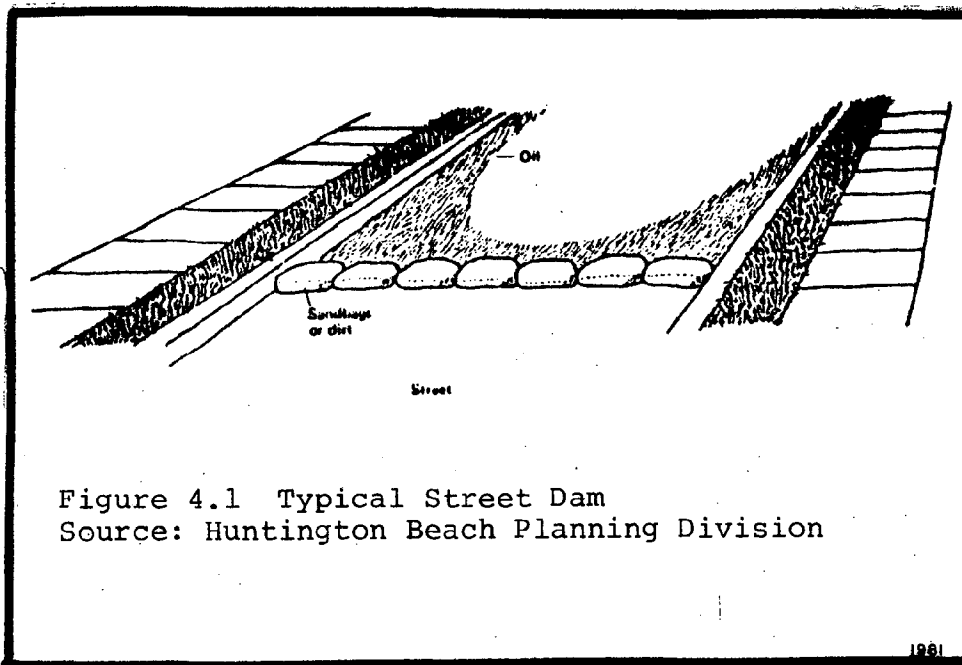
4.1 Spill Containment and Clean-up

An onshore oil spill in urbanized areas presents a potential hazard to human safety. Prior to initiating control, protection, or containment actions in an urbanized area, the following factors must be considered:

- the presence of volatile hydrocarbons
- the potential hazard a spill presents to individuals and their safety
- the potential sources of oil ignition such as running automobiles, pilot lights, and sparks.

In the event of an oil spill, human safety takes precedence over all other concerns. If needed, the City's evacuation plan will be implemented through the Fire Department - Civil Defense. Rapid and effective containment of the spill and subsequent clean-up is the best way of protecting public safety.

Oil that threatens a sensitive area may have to be diverted before it is contained and cleaned up. A spill may be diverted down a side street or into a ditch by constructing a street diversion barrier (see Figure 4.1). When selecting a diversion area, ease of recovering the oil and the comparative safety of the area must be considered. Diversion areas may be flooded with water for two reasons: 1) it may be possible to skim the oil floating on the water, and 2) water may result in less oil actually contacting the street surface, making clean-up easier. Also, where there is no pavement the amount of oil reaching subsurface soil layers will be reduced, thereby minimizing groundwater contamination.



4.2 Tank Farms

There are two major tank farms in or near the City's coastal zone, each of which store hundreds of thousands of barrels of oil. They are located adjacent to vacant lowlands, flood control channels and residential areas. Spills or leaks at these tank farms are rare, and no major spill has occurred. However, because large amounts of oil are stored so near valuable coastal resources, the possible impacts from tank farm spills and related accidents warrant detailed analysis.

The Southern California Edison Company operates a power plant in the coastal zone near Newland and Magnolia Streets. Several large storage tanks hold the fuel oil used in the boilers of the power plant. Four fuel oil tanks, each with a capacity of 230,000 barrels, a jet fuel tank (used for certain turbine units) with a capacity of 21,225 barrels, and an ammonia tank (used for pollution control devices) containing 14,650 gallons, are located immediately adjacent to the power plant. East of the flood control channel are three larger tanks holding fuel oil, each with a capacity of over 500,000 barrels. All of these tanks are in the coastal zone.

The Gulf Oil Company operates a marine terminal (an oil tanker unloading facility) off the shore of the City. Oil unloaded there is transported by pipeline to a tank farm north of Hamilton Avenue and west of Newland Street where it is temporarily stored until it can be piped to Gulf's refinery in Santa Fe Springs. The tank farm consists of three large tanks, each holding 164,000 barrels of oil, and five smaller tanks with capacities ranging from 10,000 to 53,000 barrels. This facility is not located within the coastal zone, but is situated on the coastal zone boundary.

Although there has not been a major spill at the Huntington Beach tank farms, there are rare events which could result in a serious spill: major earthquake, violent storms, floods, and liquefaction.

Severe seismic activity could 1) "slosh" the liquids in a tank so that the roof is damaged and the materials spill out, 2) stretch or strain tank materials, perhaps shearing bolts, 3) shear pipelines or, 4) collapse structures. This type of damage has occurred in past California earthquakes, sometimes resulting in spills or leaks.

The Huntington Beach tank farms are located near active faults, as is the entire City. Although no earthquake induced accidents have been recorded at these facilities, the potential exists.

Both of the City's tank farms are located in low-lying areas which are considered to be susceptible to flooding. Although it is very unlikely, severe flooding could damage these facilities.

These tank farms are also sited in areas with known liquefaction potential. Liquefaction refers to the collapse of unconsolidated soils causing surface depressions. Clearly, structures on the collapsing surface could be damaged, and this could result in spills.

Dike Systems

If an unusual event did lead to a major spill, nearby areas would most likely be protected by dike systems which surround both tank farms. These dikes range in height from four to 10 feet and are generally made of mounded and compacted soil. A dike surrounding a tank or tanks containing crude petroleum with boil-over characteristics must be able to contain 100 percent of the contents. For all other tanks, the dike must be able to contain 100 percent of the largest tank and the volume of the smaller tanks below the height of the diked area.¹⁶

A concern raised in the preparation of the Local Coastal Plan was that an unusual event which damaged a large tank would have the potential of breaking the dike system as well. This type of spill potential can be illustrated in the case of a tank farm accident in Rialto. A pump hose malfunction at this tank farm erroneously transferred gasoline into a storage tank that was already full. As a result, 90,000 gallons of gasoline overflowed into the holding area surrounded by a dike. Subsidence and erosion from recent rains had weakened the base of the dike, which in turn collapsed from the weight and volume of the spill. Fires ignited as the gasoline flowed freely into a nearby flood control channel.

Fortunately, construction crews working on the channel downstream from the tank farm were notified, and the gasoline was contained before further damage could result.

It should be noted that both the crude and the fuel oils stored at the tank farms within Huntington Beach are much less volatile and flammable and are more viscous than gasoline. Spilled oil will not flow quickly unless it is set afire, thus reducing the hazard that could result from an accidental spill. Because of the potential seriousness of one of these types of rare accidents, however, areas adjacent to the tank farms were reviewed to determine what protection is available to them in case of an accident.

Adjacent Areas

Both tank farms are situated within the flood plain of the Santa Ana River, land that was once an extensive salt water marsh. (See Figure 4.2). As discussed earlier, large expanses of the vacant lowlands adjacent to these sites may be viable wetlands. These areas support several wildlife species, including the endangered California Least Tern and the Belding's Savanna Sparrow. County flood control channels run between the tank farms and through the lowlands to the Santa Ana River, from just above its mouth to the ocean. These channels and the river are important feeding and nesting areas for water bird species. The edges of these channels are surrounded by dikes several feet high. Although the primary purpose of these dikes is to contain floodwaters in the channel, they would also act as barriers to any spilled oil. Thus, even if a major spill and damage to the tank farm system were to occur, the oil would probably not enter the waterway because of the dikes surrounding the channels. Similarly, the lowlands on the oceanside of the flood control channel would be protected from spills from the Gulf and Edison facilities. Fuel oil escaping from the older tanks at the Edison plant, however, could conceivably reach the lowlands south of Newland and west of Magnolia.

Damage to lowlands from spilled oil can be catastrophic. Clean-up is very difficult because of the moist soils and sensitive vegetation. Afterward, the habitats may be seriously, if not permanently, harmed. Fuel oil is generally more toxic and damaging than crude oil to the species inhabiting wetlands.

As discussed earlier, a study conducted as part of the Local Coastal Program suggested that the biological and aesthetic potential of these lowlands might be improved if active tidal flushing were restored. Flushing would most likely be accomplished by opening culverts or pipes from the flood control channels to the lowlands. Brackish water would then flow in and out of the low-lying land with the ebb and flow of the tide. If this improvement were undertaken, the channel and the lowlands would be much more susceptible to oil spills than they are now because the culverts or pipes would provide a conduit for the oil to reach these areas. In that case, all the lowland areas and the mouth of the Santa Ana River could be seriously impacted by a major spill. Any plans to restore tidal flushing should include consideration of a valve system by which culverts or pipes could be closed off in the case of a major spill with damage to the tank farm dike system.

Some industrial and residential areas may also be vulnerable in an uncontrolled spill. The residential area northeast of the Gulf tank farm is very close to the dike wall, but is separated from the dike by a six-foot masonry wall. This barrier would help protect the nearby houses even if the dike system failed. Similarly, it is unlikely that leaks from the dikes around the newer Edison tanks would reach any homes, due to the nature of surrounding uses and topography.

Between the flood control channel and Edison Avenue immediately northwest of Edison tank farm are mixed industrial uses. Immediately adjacent to the northeast corner of Gulf's tank farm is another residential area, with houses located within

100 feet of the dikes. In both cases, the potentially vulnerable areas are downslope from the tanks and dike systems, with the containment dikes acting as the only barrier in case of a major spill. In the case of the residences, however, the spilled oil would have to cross an open field and a street before reaching them. Thus, there would be opportunities to contain a spill before the oil reached structures.

Storm Drains and Sanitary Sewers

If at all possible, spills should not enter *storm drains* or *sanitary sewers*. In a confined sewer, explosive concentrations of hydrocarbons may be ignited and flash back along the sewer line. Also, in most sewage treatment plants, oil can severely disrupt the process by clogging the system or killing the bacteria used in the treatment plant.

If a spill enters a storm drain, it may not be possible to prevent the spill from entering the ocean. There are no shut-off valves within the storm drains, and if water is present within the drain, the spill will be carried out to the ocean. For this reason, it is important to protect the openings to storm drains in the area where the spill occurs.

Company Oil Spill Contingency Plans

The FWPCA requires operators of oil storage or processing facilities to prepare a Spill Prevention Control and Countermeasure (SPCC) Plan if a spill could conceivably reach a waterway and if the aggregate capacity of the facility is over 1,320 gallons or if any tank holds 660 gallons or more (this applies only to facilities with unburied tanks). The purpose of the plan is to ensure that personnel respond quickly and effectively during a spill. The SPCC plan must include an inventory of potential spill sources, estimates of the anticipated quantities which could spill from each source, probable direction of flow, containment systems and equipment inspection procedures.

Presently, oil spill plans for tank farms recognize the use of a dike system for

containment, but they do not explicitly acknowledge the importance of protecting land uses in susceptible adjacent areas. All spill plans should include specific procedures for protecting these areas in the case of a threatening spill.

A considerable amount of controversy exists over whether the lowlands adjacent to the tank farms are potential wetlands. The California Coastal Commission may be required to make the final determination on whether or not these lowlands are able to support a productive wetland habitat.

If the lowlands are found to be wetlands, the City should petition the EPA to require tank farm facilities to prepare SPCC plans that include the following provisions:

- A written commitment to expedite containment and clean-up of any oil discharged.
- Recognition of adjacent areas that are especially sensitive to spill damage: 1) Santa Ana River mouth and flood control channel; 2) the wetlands and residential/industrial areas; and 3) storm and sanitary sewers.
- A topographical map outlining the direction oil would flow should a dike system fail.
- A diversion system that would prevent oil or any harmful substance from reaching the flood control channel, wetlands, or sewer lines in the event of an uncontrolled spill.
- Provision for detailed inspection of the diked areas following heavy rains to assure impermeability of the dikes and to verify functional operation of runoff valves.

Fire Department Reviews

The City Fire Department reviews the site plans for the tank farms which identify the types of substances stored in each tank

and the location of access points and on-site fire-fighting equipment. The Fire Department requires these facilities to meet minimum standards for building materials, dike system capacities, access provisions, and the presence of on-site hoses, hydrants and other fire prevention and containment equipment.

Evacuation Plans

Even if a major spill were contained in the dike systems, nearby areas could be seriously threatened if the oil were to ignite or explode. The heat and burning debris could threaten life and set nearby structures on fire. The smoke and fumes could cause serious property damage and would certainly be a health hazard. A tank farm fire in Torrance in December 1979 killed three people, including one person driving in a car near the conflagration. The fire raged for two days, forcing the evacuation of 300 nearby residences before the dangerous situation was safely under control.

Residences and public roads are just as close to the tanks in Huntington Beach as they are in Torrance, although most of the substances stored here, such as crude oil, are significantly less flammable.

Clearly, a major concern if such an accident were to occur would be the evacuation of nearby residents. The City's Civil Defense Division, in cooperation with the Fire and Police Departments, has a general evacuation contingency plan which would be employed if a fire or explosion threatened surrounding areas.

The Planning Division consulted with the Civil Defense Division -- which has expertise in emergency planning -- on whether evacuation plans specific to the tank farm sites should be developed. Their conclusion was that such plans would be no more effective than the existing plan, which is sufficient to safely evacuate those areas.

5.0 Conclusions and Recommendations

5.1 Conclusions

Local governments have significant involvement with the containment and clean-up of spills, particularly smaller onshore spills. Often, the Fire Department will be the first agency to respond to the incident. Once the spiller is identified and notified, the company usually assumes responsibility for containment and clean-up. But, if the spiller is not known, the Fire Department may actually contain the spill and will determine if assistance from higher levels of government is needed.

Existing oil spill plans in Huntington Beach are generally adequate for spills which occur onshore or wash ashore. The City is prepared to respond to such spills and to initiate the containment process if necessary. If a spill remains at sea, the responsible party or Coast Guard will assume responsibility as discussed in Section 2.3.

The dike systems around the tanks provide the primary source of protection should a tank accident occur. Even if a dike system should fail, nearby residential and commercial areas have additional protection from masonry walls and topography. The high viscosity and low flammability of most of the liquids stored in the facilities reduces the hazard potential. Existing evacuation plans were reviewed and found to be adequate in case of an emergency.

5.2 Recommendations

The City is continually working on ways to improve the spill protection afforded its resources. The following recommendations are based on the research and analysis conducted in this project.

- Communication should be improved among levels of government and agencies involved in containing and

cleaning a spill. The City should support efforts to revise the State Spill Plan to increase state-local coordination in spill emergency planning and, as much as possible, participate in such efforts.

- Periodic drills for mock emergencies should be included in the City's offshore spill plan.

To date, a major spill has not washed ashore on a City beach. Periodic drills would ensure that the plan can be effectively carried out in the event of a major spill.

- Industry and co-op spill contingency plans should recognize the protection priority for different shoreline resources discussed in Section 3.0.
- The Coastal Commission should be requested to require that the State spill plan address the problem of inadequate

disposal sites for spilled oil and other hazardous substances as discussed in Section 3.1.

- Protection priorities for offshore spills should be established on a regional basis since it is possible that a major spill will affect more than one jurisdiction's shoreline. The priorities may include diversion booming as discussed in Section 3.2, and preferred areas to land the oil.
- The City should petition EPA to require SPCC plans for the tank farms near lowland areas and storm drains, especially if restoration programs in those lowlands are undertaken.
- The City should restrict new development near tank farms unless secondary barriers and other protective measures are incorporated, as necessary.

NOTES

- 1 Huntington Beach Planning Division, Coastal Energy Impact Program, 1980.
- 2 The actual process for notification may be different given the size and location of the spill.
- 3 EPA does not have the personnel to send a representative to the location of every inland spill in this area; (EPA's office is located in San Francisco). Thus, for spills under 10,000 gallons, EPA requests the Coast Guard to represent them as the first federal agency on scene. If the spill is over 10,000 gallons, or if it is small but severe, the EPA will usually send its own representative.
- 4 Marvin Waterstone, "Oil Spills: Legal and Technical Response", New Jersey Department of Energy, Coastal Energy Impact Program, 1981.
- 5 The regional response plan for this area is the U.S. Coast Guard's "Los Angeles, Long Beach Oil and Hazardous Pollution Contingency Plan".
- 6 Attorney General
California Highway Patrol
California National Guard
Department of Conservation
Department of Fish and Game
Department of Health
Department of Transportation
Department of Parks and Recreation
Department of Water Resources
Department of Forestry
Office of Emergency Services
State Lands Division
State Water Resources Control Board
- 7 Attorney General
California Department of Forestry
California Highway Patrol
California National Guard
Department of Fish and Game
Department of Health
Department of Transportation
Department of Parks and Recreation
Department of Water Resources
Division of Oil and Gas
Office of Emergency Services
Regional Water Quality Control Board
State Lands Division
Representatives of other governmental agencies as appropriate.
Representatives of industry as appropriate.

- 8 Oral communication, Huntington Beach Fire Department.
- 9 State of California, Office of Planning and Research, Offshore Oil and Gas Development: Southern California, 1977
- 10 Coastal Energy Impact Program, op.cit. and Offshore Oil and Gas, op.cit.
- 11 Waterstone, op.cit.
- 12 Offshore Oil and Gas, op.cit.
- 13 Waterstone, op.cit.
- 14 Southern California - Petroleum Contingency Organization, Response Measures for Selected Economic and Biologically Sensitive Areas.
- 15 Ibid.
- 16 As required by the Huntington Beach Fire Code.

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